# SLOVENSKI STANDARD
# SIST EN 50264-2-1:2008

**01-september-2008**

**Nadomeġļa:**
**SIST EN 50264-2:2003**

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**Železniške naprave - Energetski in krmilni kabli za železniška vozna sredstva, ki imajo posebne ognjevarne lastnosti - 2-1. del: Kabli z zamreženo elastomerno izolacijo - Enožilni kabli**

Railway applications - Railway rolling stock power and control cables having special fire performance -- Part 2-1: Cables with crosslinked elastomeric insulation - Single core cables



Bahnanwendungen - Starkstrom- und Steuerleitungen für Schienenfahrzeuge mit verbessertem Verhalten im Brandfall -- Teil 2-1: Leitungen mit vernetzter elastomerer Isolierung - Einadrige Leitungen



Applications ferroviaires - Câbles de puissance et de contrôle à comportement au feu spécifié pour matériel roulant ferroviaire -- Partie 2-1: Câbles à enveloppe isolante réticulée - Câbles monoconducteurs

**Ta slovenski standard je istoveten z:** **EN 50264-2-1:2008**

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| 13.220.20 | Poġarna zaġļ ita | Fire protection |
| 29.060.20 | Kabli | Cables |
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# EN 50264-2-1

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English version

# Railway applications - Railway rolling stock power and control cables having special fire performance - Part 2-1: Cables with crosslinked elastomeric insulation - Single core cables

Applications ferroviaires - Câbles de puissance et de contrôle à comportement au feu spécifié pour matériel roulant ferroviaire - Partie 2-1: Câbles à enveloppe isolante réticulée - Câbles monoconducteurs

Bahnanwendungen - Starkstrom- und Steuerleitungen für Schienenfahrzeuge mit verbessertem Verhalten im Brandfall - Teil 2-1: Leitungen mit vernetzter elastomerer Isolierung - Einadrige Leitungen



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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## Foreword

This European Standard was prepared by Working Group 12, Railway cables, of the Technical Committee CENELEC TC 20, Electric cables, as part of the overall programme of work in the Technical Committee CENELEC TC 9X, Electrical and electronic applications for railways.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50264-2-1 on 2008-03-01.

This European Standard supersedes EN 50264-2:2002.

The following dates were fixed:

| | | |
|---|---|---|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2009-03-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2011-03-01 |

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## Introduction

The EN 50264 series covers a range of cables, based upon halogen free materials, for use in railway rolling stock. It is divided into 5 parts under the generic title *"Railway applications - Railway rolling stock power and control cables having special fire performance"*:

– Part 1 General requirements;

– Part 2-1 Cables with crosslinked elastomeric insulation – Single core cables;

– Part 2-2 Cables with crosslinked elastomeric insulation – Multicore cables;

– Part 3-1 Cables with crosslinked elastomeric insulation with reduced dimensions – Single core cables;

– Part 3-2 Cables with crosslinked elastomeric insulation with reduced dimensions – Multicore cables.

Information regarding selection and installation of cables, including current ratings can be found in EN 50355 and EN 50343. The procedure for selection of cable cross-sectional area, including reduction factors for ambient temperature and installation type, is described in EN 50343.

Special test methods referred to in EN 50264 are given in EN 50305.

The cables in EN 50264-2-1 may also be used in EN 50264-2-2 to build up multicore sheathed cables.

Part 1, "*General requirements*", contains a more extensive introduction to EN 50264, and should be read in conjunction with this Part 2-1.

## 1 Scope

EN 50264-2-1 specifies requirements for, and constructions and dimensions of, single core cables of the following types and voltage ratings:

- 0,6/1 kV unscreened, unsheathed (1 mm² to 400 mm²);
- 1,8/3 kV unscreened, unsheathed (1,5 mm² to 400 mm²);
- 1,8/3 kV unscreened, sheathed (1,5 mm² to 400 mm²);
- 3,6/6 kV unscreened, sheathed (2,5 mm² to 400 mm²).

All cables have class 5 tinned copper conductors to EN 60228, halogen-free insulation and halogen-free sheath. They are for use in railway rolling stock as fixed wiring, or wiring where limited flexing in operation is encountered. The requirements provide for a continuous conductor temperature not exceeding 90 °C and a maximum temperature for short circuit conditions of 200 °C based on a duration of 5 s.

Under fire conditions the cables exhibit special performance characteristics in respect of maximum permissible flame propagation (flame spread) and maximum permissible emission of smoke and toxic gases.

EN 50264-2-1 should be read in conjunction with Part 1 "*General requirements*".

## 2 Normative references



The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.



EN 10002-1 Metallic materials – Tensile testing – Methods of test at ambient temperature

EN 50264-1:2008 Railway applications – Railway rolling stock power and control cables having special fire performance – Part 1: General requirements

EN 50266-2-4 Common test methods for cables under fire conditions – Test for vertical flame spread of vertically-mounted bunched wires or cables – Part 2-4: Procedures – Category C

EN 50266-2-5 Common test methods for cables under fire conditions – Test for vertical flame spread of vertically-mounted bunched wires or cables – Part 2-5: Procedures – Small cables – Category D

EN 50305:2002 Railway applications – Railway rolling stock cables having special fire performance – Test methods

EN 60228 Conductors of insulated cables (IEC 60228)

EN 60332-1-2 Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame (IEC 60332-1-2)

EN 60811-1-1:1995 Insulating and sheathing materials of electric and optical cables – Common test methods – Part 1-1: General application – Measurement of thickness and overall dimensions – Tests for determining the mechanical properties (IEC 60811-1-1:1993)

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|---|---|
| EN 60811-1-2:1995 | Insulating and sheathing materials of electric cables – Common test methods – Part 1-2: General application – Thermal ageing methods (IEC 60811-1-2:1985 + A1:1989 + corr. May 1986) |
| EN 60811-1-3:1995 | Insulating and sheathing materials of electric and optical cables – Common test methods – Part 1-3: General application – Methods for determining the density – Water absorption tests – Shrinkage test (IEC 60811-1-3:1993) |
| EN 60811-1-4:1995 | Insulating and sheathing materials of electric and optical cables – Common test methods – Part 1-4: General application – Tests at low temperature (IEC 60811-1-4:1985 + A1:1993 + corr. May 1986) |
| EN 60811-2-1:1998 | Insulating and sheathing materials of electric and optical cables – Common test methods – Part 2-1: Methods specific to elastomeric compounds – Ozone resistance, hot set and mineral oil immersion tests (IEC 60811-2-1:1998) |
| EN 61034-2 | Measurement of smoke density of cables burning under defined conditions – Part 2: Procedure and requirements (IEC 61034-2) |
| HD 308 | Identification of cores in cables and flexible cords |

## 3 Definitions



For the purposes of this document, the terms and definitions given in EN 50264-1 apply.



## 4 Rated voltage



The rated voltage for single-core insulated cables shall be as follows:

a) unsheathed: 0,6/1 kV; 1,8/3 kV;

b) sheathed: 1,8/3 kV; 3,6/6 kV.

## 5 Marking and identification

### 5.1 Marking of cable

Cables shall be marked with the following:

- manufacturer's name;
- EN reference;
- voltage rating ($U_o$);
- conductor size;
- a code designation according to Annex A.

An example of a complete mark is:

XYZ EN 50264-2-1 1800 V 400 FF

The marking shall conform to the requirements of EN 50264-1, Clause 5.

### 5.2 Core identification

The core insulation of all cables shall be black unless otherwise specified. If a colour other than black is specified it shall be a colour in accordance with HD 308. The colour shall be on the surface or throughout the insulation.

The colour shall be clearly identifiable and durable. Durability shall be checked by the test given in EN 50305, 10.1.

Conformity with these requirements shall be verified by visual examination.

### 5.3 Sheath

The sheath shall be black unless otherwise specified.

## 6 Construction of cables

### 6.1 General

The cable shall conform to the applicable general requirements given in EN 50264-1 and to the specific requirements of this part.

Conformity with the requirements shall be checked by inspection and by the tests given in Table 5.



The cable dimensions shall be as given in Tables 1 to 4 as appropriate to the cable type.



### 6.2 Conductor



Conductors shall be tin-coated annealed copper, class 5, according to EN 60228.

When tested in accordance with EN 10002-1 the minimum average elongation of the wires from the conductor shall be 15 %, with a minimum value of 10 % for any individual wire.

NOTE It is not necessary to test every individual wire. 5 % of wires or 10 wires, whichever is the least number, should be selected at random.

### 6.3 Conductor screening

For cables in Table 4 conductor screening shall be as given in EN 50264-1, 6.1.6.

### 6.4 Separator

**6.4.1** A separator may be used over the conductor if the cable construction does not include a conductor screen.

**6.4.2** A separator may be included between the insulation and the sheath.

### 6.5 Insulation system

The insulation shall be one or more extruded materials as defined in EN 50264-1 applied so as to meet the requirements of EI 101 to EI 105.

For single-core unsheathed and sheathed cable:

EI 101 low temperature resistant, oil resistant;

EI 102 extra low temperature resistant, oil resistant;

EI 103 low temperature resistant, extra oil and fuel resistant;

EI 104 extra low temperature resistant, extra oil and fuel resistant.

For sheathed cables:

EI 105 extra low temperature resistant, non oil resistant.

EI 105 may be used as the inner layer of a multilayer insulation system.

To claim extra low temperature performance both insulation and sheath shall be extra low temperature resistant.

The insulation shall be applied to meet the requirements of EN 50264-1, 6.2.

The insulation thickness shall conform to the specified value given in Tables 1 to 4.

### 6.6 Sheath



Sheath shall be an extruded material as defined in EN 50264-1 applied so as to meet the requirements of compound type EM 101, EM 102, EM 103 or EM 104:



EM 101 low temperature resistant, oil resistant;



EM 102 extra low temperature resistant, oil resistant;

EM 103 low temperature resistant, extra oil and fuel resistant;

EM 104 extra low temperature resistant, extra oil and fuel resistant.

The sheath shall consist of one or more closely adherent layers of the same type.

The sheath shall be applied to meet the requirements of EN 50264-1, 6.6.

The sheath thickness shall conform to the specified value given in Tables 3 and 4.

### 6.7 Constructional components

#### 6.7.1 Unsheathed cable (Tables 1 and 2 - 0,6/1 kV and 1,8/3 kV)

Cable in Tables 1 and 2 shall be composed of the following components in the order given:

- conductor flexible tin coated annealed copper, class 5;
- separator optional;
- insulation a compound or compounds given in 6.5.